

Chapter 1 : Layers of Earth's Atmosphere - Windows to the Universe

These are the first X-class flares since May , and the X ejection was the eighth strongest since records began in It was the most powerful since an enormous X17 flare burst forth in.

The atmosphere is a mixture of gases that becomes thinner until it gradually reaches space. Oxygen is essential to life because it allows us to breathe. Some of the oxygen has changed over time to ozone. Recently, there have been many studies on how humans have caused a hole in the ozone layer. Due to increases in gases, like carbon dioxide, that trap heat being radiated from the Earth, scientists believe that the atmosphere is having trouble staying in balance creating the greenhouse effect. The atmosphere is divided into five layers depending on how temperature changes with height. Most of the weather occurs in the first layer. It is thickest near the surface and thins out with height until it eventually merges with space. Weather occurs in this layer. Many jet aircrafts fly in the stratosphere because it is very stable. Also, the ozone layer absorbs harmful rays from the Sun. Meteors or rock fragments burn up in the mesosphere. The thermosphere is a layer with auroras. It is also where the space shuttle orbits. The atmosphere merges into space in the extremely thin exosphere. This is the upper limit of our atmosphere. The air is very well mixed and the temperature decreases with altitude. Air in the troposphere is heated from the ground up. The surface of the Earth absorbs energy and heats up faster than the air does. The heat is spread through the troposphere because the air is slightly unstable. On Earth, ozone causes the increasing temperature in the stratosphere. Ozone is concentrated around an altitude of 25 kilometers. The ozone molecules absorb dangerous kinds of sunlight, which heats the air around them. The stratosphere is located above the top of the the troposphere. Why does the topic of ozone make the news so much? How important is the ozone in our atmosphere? Why are scientists so concerned about its increase near the surface of the Earth and its disappearance higher up in the atmosphere? First things first - what is ozone? Ozone is made of three oxygen atoms O₃. The oxygen in our atmosphere that we breathe is made up of two oxygen atoms O₂. When enough ozone molecules are present, it forms a pale blue gas. Ozone has the same chemical structure whether it is found in the stratosphere or the troposphere. Where we find ozone in the atmosphere determines whether we consider it to be "good" or "bad"! In the troposphere, the ground-level or "bad" ozone is an air pollutant that damages human health, vegetation, and many common materials. It is a key ingredient of urban smog. We have good reason to be concerned about the thinning of the ozone layer in the stratosphere. We also have good reason to be concerned about the buildup of ozone in the troposphere. Although simplistic, the saying "Good up high and bad near by," sums up ozone in the atmosphere. Ozone forms a kind of layer in the stratosphere, where it is more concentrated than anywhere else. While both oxygen and ozone together absorb 95 to 99 percent of the sun's harmful ultraviolet light. This ultraviolet light can cause biological damage like skin cancer, tissue damage to eyes and plant tissue damage. The protective role of the ozone layer in the upper atmosphere is so vital that scientists believe life on land probably would not have evolved - and could not exist today - without it. The ozone layer would be quite good at its job of protecting Earth from too much ultraviolet radiation - that is, it would if humans did not contribute to the process. While the stratospheric ozone issue is a serious one, in many ways it can be thought of as an environmental success story. Scientists detected the developing problem, and collected the evidence that convinced governments around the world to take action. Although the elimination of ozone-depleting chemicals from the atmosphere will take decades yet, we have made a strong and positive beginning. The mesosphere is on top of the stratosphere. The upper parts of the atmosphere, such as the mesosphere, can sometimes be seen by looking at the very edge of a planet. The air is really thin in the thermosphere. A small change in energy can cause a large change in temperature. The ionosphere is a region of the atmosphere that is filled with charged particles. The high temperatures in the thermosphere can cause molecules to ionize. This is why an ionosphere and thermosphere can overlap. The Ionosphere Scientists call the ionosphere an extension of the thermosphere. So technically, the ionosphere is not another atmospheric layer. The ionosphere represents less than 0. Even though it is such a small part, it is extremely important! The upper atmosphere is ionized by solar radiation. So there ends up being electrons floating around and molecules which have lost or gained electrons. When the Sun is active, more and more ionization happens! Different

regions of the ionosphere make long distance radio communication possible by reflecting the radio waves back to Earth. It is also home to auroras. Temperatures in the ionosphere just keep getting hotter as you go up! The breakdown is based on what wavelength of solar radiation is absorbed in that region most frequently. The D region is the lowest in altitude, though it absorbs the most energetic radiation, hard x-rays. The E region peaks at about km. It absorbs soft x-rays. The F region starts around km and has a maximum around km. It is the highest of all of the regions. Extreme ultra-violet radiation EUV is absorbed there. Radio waves with shorter lengths are reflected by the F region. Visible light, television and FM wavelengths are all too short to be reflected by the ionosphere. This image shows how the ionosphere is divided even further into layers: D, E, and F layers. We call this region of atmosphere the ionosphere. During this process, electrons are knocked free from molecules or particles in the atmosphere. Flares and other big events on the Sun produce increased ultraviolet, x-ray and gamma-ray photons that arrive at the Earth just 8 minutes later other particles from the Sun may arrive days later and dramatically increase the ionization that happens in the atmosphere. So, the more active the Sun, the thicker the ionosphere! It is this solar radiation that ionizes the upper atmosphere, creating the ionosphere. The region where atoms and molecules escape into space is referred to as the exosphere. The exosphere is on top of the thermosphere. Last modified September 1, by Randy Russell. Shop Windows to the Universe Science Store! Windows to the Universe Community News.

Chapter 2 : Largest solar flares in a decade burst forth during the Sun's "quiet" time

An artist's rendering of a black hole. NASA/JPL-Caltech. Physicist Georges Lemaître first laid the groundwork for the Big Bang theory in the 1920s when he proposed an ever-expanding universe.

They were, for the most part, purely elemental beings - Uranus was the literal sky, Gaea the body of the earth, etc. A few of them were occasionally described or portrayed in anthropomorphic form, however these forms were inevitably inseparable from their native element. For example Gaea or Thalassa might appear as a woman half risen from the earth or sea. She was the mate of Chronus Time and like him was an incorporeal, serpentine being who twisted circling around the whole of creation. She filled the gap between the bright mists of the heavenly aither and the floor of the earth. From Chaos were descended the other airs: Erebus darkness, Nyx night, Aether light, Hemera day; as well as the birds. Only late classical writers describe Khaos as a primeval mixture of the elements. He was a three-headed, incorporeal being with serpentine tail, who circled the whole of creation, entwined with his consort Ananke. His dark element was sunk into the hollows of the earth, and encircled the dismal realm of the underworld. He was one of the first beings to emerge at creation, and caused the universe to procreate. Mother Earth emerged at the beginning of creation to form the foundation of the universe. Gaea was one of the few Protogenoi to be depicted in anthropomorphic form, however even as such she was shown as a woman partially risen from the ground, inseparable from her native form. HEMERA The Protogenos of the day, rose up from the ends of the earth to scatter the dark mists of night, spread across the heavens by her mother Nyx, and reveal to the earth below the bright shining blue of the Aether, her protogenic consort. Together with the earth he formed the primeval Mud. Hydros was usually equated with the earth-encircling, fresh-water Titan Oceanus. Their rocky forms were broken from the earth by Poseidon and cast into the sea. Her anthropomorphic form was of a woman clothed in star-spangled mantle. From his flow every river, spring and rain-bearing cloud was sprung. His anthropomorphic form was that of a horned man with the tail of a serpentine fish in place of legs. Their rocky forms were born of Gaea the Earth. He was sprung from a silver egg, the seed of creation, at the beginning of time, and set the universe in order. Phanes was also named Eros or simply Protogonos the First Born. According to some Zeus swallowed him whole to gain supremacy over the universe. She was related to both Gaea and Tethys. He sprung from Gaea the Earth at the beginning of creation, when the elements of the universe were set in their proper order. He was the anti-heaven: The Titans were imprisoned in his depths. She was an aspect of all-nourishing Mother Nature. From Tethys and her husband Oceanus the rivers, springs and clouds drew their waters. She was born of Aether light and Hemera day. Mixing with the deep waters of Pontus sea Thalassa spawned the schools of fish. He sprung forth from Gaea the Earth at the beginning of creation. Later his son Cronus, seized and castrated him, as he descended to consort with Mother Earth. In truth at first Khaos Air came to be, but next wide-bosomed Gaia Earth, the ever-sure foundation of all the deathless ones who hold the peaks of snowy Olympos, and dim Tartaros the Pit in the depth of the wide-pathed Earth, and Eros Love, fairest among the deathless gods, who unnerves the limbs and overcomes the mind and wise counsels of all gods and all men within them. And Gaia Earth first bore starry Ouranos Heaven, equal to herself, to cover her on every side, and to be an ever-sure abiding-place for the blessed gods. And she brought forth long Ourea Mountains, graceful haunts of the goddess Nymphai who dwell amongst the glens of the hills. She bore also the fruitless deep with his raging swell, Pontos Sea, without sweet union of love. After them was born Kronos the wily. Firstly, black-winged Nyx Night laid a germless egg in the bosom of the infinite deeps of Erebos Darkness, and from this, after the revolution of long ages, sprang the graceful Eros Love with his glittering golden wings, swift as the whirlwinds of the tempest. He mated in deep Tartaros Hell-Pit with dark Khaos Air, winged like himself, and thus hatched forth our race [the birds], which was the first to see the light. That of the Immortals did not exist until Eros had brought together all the ingredients of the world, and from their marriage Ouranos Heaven, Okeanos Ocean, Ge Earth and the imperishable race of blessed gods Theoi sprang into being.

Chapter 3 : The First Cause Argument

Flares happen in three stages. First, you get the precursor stage, with a blast of soft X-ray radiation. which drives charges through wires back and forth, burning out circuits, killing.

What Was the Carrington Event? With all this technology surrounding us in all directions. At all times in the Cain household, there dozens of internet devices connected to my wifi router. If I could use two smartphones at the same time, I totally would. Maybe enjoy the beauty of nature, or something boring like that. It turns out, that terrible burning orb in the sky, the Sun, is fully willing and capable of bricking our precious technology. NASA In fact, we got a sneak preview of this back in , when a massive solar storm engulfed the Earth and ruined our old timey technology. It was known as the Carrington Event. Follow your imagination back to Thursday, September 1st, This was squarely in the middle of the Victorian age. And not the awesome, fictional Steampunk Victorian age where spectacled gentleman and ladies of adventure plied the skies in their steam-powered brass dirigibles. No, it was the regular crappy Victorian age of cholera and child labor. Technology was making huge leaps and bounds, however, and the first telegraph lines and electrical grids were getting laid down. On that fateful morning, the British astronomer Richard Carrington turned his solar telescope to the Sun, and was amazed at the huge sunspot complex staring back at him. So impressed that he drew this picture of it. While he was observing the sunspot, Carrington noticed it flash brightly, right in his telescope, becoming a large kidney-shaped bright white flare. Carrington realized he was seeing unprecedented activity on the surface of the Sun. Within a minute, the activity died down and faded away. And then about 5 minutes later. Aurora activity erupted across the entire planet. Even in the tropics. In fact, the brilliant auroras were so bright you could read a book to them. The beautiful night time auroras was just one effect from the monster solar flare. The other impact was that telegraph lines and electrical grids were overwhelmed by the electricity pushed through their wires. Operators got electrical shocks from their telegraph machines, and the telegraph paper lit on fire. The most powerful solar flare ever observed is what happened. In a moment, the magnetic fields reorganize themselves, and a huge wave of particles and radiation is released. Flares happen in three stages. First, you get the precursor stage, with a blast of soft X-ray radiation. This is followed by the impulsive stage, where protons and electrons are accelerated off the surface of the Sun. And finally, the decay stage, with another burp of X-rays as the flare dies down. These stages can happen in just a few seconds or drag out over an hour. Remember those particles hurled off into space? Today, our entire civilization depends on wires. There are wires in the hundreds of satellites flying overhead that we depend on for communications and navigation. Our homes and businesses are connected by an enormous electrical grid. Everything is electronic, or controlled by electronics. We got a sneak preview back in March, when a much smaller geomagnetic storm crashed into the Earth. For 12 hours, in the freezing Quebec winter, almost the entire province was without power. And on July 23, , a Carrington-class solar superstorm blasted off the Sun, and off into space. Fortunately, it missed the Earth, and we were spared the mayhem. Thankfully for us and our technology, it missed. Locate nearby interesting nature spots to explore and enjoy while you wait for our technological civilization to be rebuilt. Have you ever seen an aurora in your lifetime? Give me the details of your experience in the comments.

Chapter 4 : The Champions (Hero Universe) - Wikipedia

Twentieth century science revolutionized human understanding of the world, rewriting the story of the universe with discoveries and theories - the big bang, the relativity of space and time, the accelerating expansion of the universe, along with increasingly refined ideas of evolution and the origin of life.

Some religious traditions, such as Hinduism and Buddhism, view the universe as essentially eternal, without beginning or end in the stream of time as we perceive it. The first books of the Bible contain an account of the creation of the universe which some Christian faiths hold to be allegorical and some hold to be an expression of literal fact. Other religious traditions have other views, but each attempts to explain this ultimate question of where we came from and how it came to be. Scientology beliefs concerning the origins of the universe and Mankind follow the much older tradition of Eastern religion dating back to the Vedic Hymns. Scientology religious beliefs concerning the creation of the universe flow from the theory that the life force present in all living things referred to in Scientology by the Greek letter theta created the physical universe of matter, energy, space and time known by the acronym MEST. Theta and MEST combine to form living organisms. Scientology beliefs concerning the origins of the universe and Mankind follow the tradition of Eastern religion dating back to the Vedic Hymns. Just as the combination of theta and MEST produces life, their separation is synonymous with death of the organism. The human body, like all life forms, follows a cycle of birth, growth and survival, and ultimately death. And he also realizes, oddly enough, in his own participation. Scientology Religious Beliefs Scientology is a truly unique contemporary religion—the only major religion to emerge in the 20th century and flourish in the 21st. While it owes a spiritual debt to Eastern religions, it was born in the West and its religious beliefs are expressed in the technological language of the mid 20th century. Scientology adds a precise and workable technology for applying spiritual concepts to every aspect of life. Scientology holds that Man is basically good, and that his spiritual salvation depends upon himself, his relationships with his fellows and his attainment of brotherhood with the universe. Scientology offers a very practical approach to attaining this spiritual aim. Of this, Scientology Founder L. For countless ages a goal of religion has been the salvage of the human soul. Man has tried by many practices to find the pathway to salvation. He has held the imperishable hope that someday, in some way, he would be free. And the technologies with which Scientology can bring about a new state of being in Man are likewise new. An understanding of these religious beliefs will illustrate how Scientology fits within the religious and spiritual traditions of the world. His works include dozens of books, dozens more encyclopedic volumes containing thousands upon thousands of individual writings, and nearly 2, recorded lectures. He recorded the many varied mental and spiritual phenomena he encountered in his search for the truth. Out of this vast ocean of material, Mr. Hubbard distilled the fundamental axioms that comprise the Scientology religion. Anyone wishing to find out more about what Scientologists truly believe should read Scientology: The Fundamentals of Thought , or any other Scientology book by L. They are widely available in bookstores, libraries and at www.

Chapter 5 : flare Archives - Universe Today

The Universe is thought to be infinite, so as time goes on we can see farther and farther away, and thanks to its infinite size and inflation, there are already objects at all distances in the universe for us to see there.

A number of teenagers, who call themselves "The Gladers", are left in a strange place which they call "The Glade". Beyond the walls of the Glade is the ever-changing maze, with its horrifying creatures, the Grievors. Every month a newcomer, a "greenie", joins the Gladers, sent by a lift with all past memories except language and other common things wiped out. The only thing that they really do remember is their name. The ultimate goal of The Gladers, is to find a way out of The Glade. To do so, the runners venture into the Maze every day, to map it in an attempt to find a pattern in the Maze that would lead them to find an exit. When Thomas, a curious newcomer, arrives at the Glade and ventures into the Maze, unusual things begin to happen. The Gladers thought that getting through the maze was it; however, they did not know that their world was scorched by the sun. The Gladers did not know that they would have to fight for their lives once more. Burning and naked, the earth is a wasteland, its people driven mad by an infection known as "The Flare". Instead of freedom, the Gladers must face another Trial. In the final book of "The Maze Runner" Series, Thomas is locked up in solitary confinement for four weeks. He warns them that many people in the outside world hate them because of their unnatural resistance to the Flare, and that if they escape they will most likely be in more danger. Thomas, Newt, and Minho refuse restoration and they later escape with Jorge and Brenda.

The Kill Order[edit] Main article: It is the first novel in narrative order, set prior to the events of The Fever Code and 13 years before the events in The Maze Runner. Of the novel, Dashner stated that he wanted to expand the world, but not focus on the main characters of the main Maze Runner trilogy. Mark and Trina were there when it happened, and survived. The book is divided into three parts: The Fever Code[edit] Main article: It is the second prequel and the fifth installment of The Maze Runner series. The novel is written from the various points of view of "The Gladers". This book gives a background of the series, providing the reader with information they have been asking themselves. The book ends with the final moments before Thomas enters the Box, when he is betrayed and sent into the Maze at the beginning of The Maze Runner. He is the main protagonist of the series, named after Thomas Edison. He has a slight limp from attempting suicide when he was a Runner. Newt was named after Sir Isaac Newton. He is the brother of Sonya, a girl in Group B, who he called Lizzie. He then became Leader of the Gladers in the Scorch. He serves as the main antagonist for Thomas in the first book, however after being presumed dead for the second book, comes back to become an ally in the third. Gally was named after Galileo. He is named after Albert Einstein. He was named after Charles Darwin. He is named after Sigmund Freud. All epilogues of the three books consist of an e-mail written by Dr. Paige to her associates. Eventually, they discover that she is an Immune. He was named after Aristotle. She is named after Harriet Tubman. She is the younger sister of Newt. Her name was originally Elizabeth; Newt calls her Lizzy. He survived the catastrophic solar flares and escaped to the Appalachians. He survived the solar flares to become one of the protagonists in The Kill Order. She is also the love interest of Mark. Kirkus Reviews wrote, "Hard to put down, this is clearly just a first installment, and it will leave readers dying to find out what comes next". Maze Runner film series The Maze Runner:

Chapter 6 : Primordial Gods & Goddesses | Theoi Greek Mythology

The Maze Runner is the first book in the series and was released on October 6, A number of teenagers, who call themselves "The Gladers", are left in a strange place which they call "The Glade". Beyond the walls of the Glade is the ever-changing maze, with its horrifying creatures, the Grievers.

The biggest solar proton storm in 15 years erupted last week. NASA researchers discuss what it might have done to someone on the Moon. Listen to this story via streaming audio, a downloadable file, or get help. NASA is returning to the Moon--not just robots, but people. In the decades ahead we can expect to see habitats, greenhouses and power stations up there. Astronauts will be out among the moon dust and craters, exploring, prospecting, building. Last week, though, there were no humans walking around on the Moon. The blast sparked an X-class solar flare, the most powerful kind, and hurled a billion-ton cloud of electrified gas a "coronal mass ejection" into space. Solar protons accelerated to nearly light speed by the explosion reached the Earth-Moon system minutes after the flare--the beginning of a days-long "proton storm. In fact, the storm was good. The Moon is a different story. It was particularly rich in high-speed protons packing more than million electron volts MeV of energy. Such protons can burrow through 11 centimeters of water. A thin-skinned spacesuit would have offered little resistance. These symptoms might persist for days. Giant sunspot and a passing airplane photographed by amateur astronomer Jan Koeman of the Netherlands on Jan. One rem, short for Roentgen Equivalent Man, is the radiation dose that causes the same injury to human tissue as 1 roentgen of x-rays. A typical diagnostic CAT scan, the kind you might get to check for tumors, delivers about 1 rem [ref]. So for the crew of the ISS, the Jan. On the Moon, Cucinotta estimates, an astronaut protected by no more than a space suit would have absorbed about 50 rem of ionizing radiation. The key word is suddenly. You can get rem spread out over a number of days or weeks with little effect. Spreading the dose gives the body time to repair and replace its own damaged cells. But if that rem comes all at once Such doses from a solar flare are possible. At the time, the crew of Apollo 16 had just returned to Earth in April while the crew of Apollo 17 was preparing for a moon-landing in December. Luckily, everyone was safely on Earth when the sun went haywire. Researchers have been studying it ever since. Cucinotta estimates that a moonwalker caught in the August storm might have absorbed rem. One of the August solar flares. Click to view a 2-MB mpeg movie of the explosion, which solar physicists call "the seahorse flare. Modern spaceships are even safer. Big numbers, which represent thick hulls, are better: A typical space suit, meanwhile, has only 0. Like explorers on Earth, they can check the weather forecast--the space weather forecast. Is a coronal mass ejection coming?

Chapter 7 : How Did the Universe Begin? Not With a Big Bang, Says Physicist Behind 'Bouncing Universe'

Flares and other big events on the Sun produce increased ultraviolet, x-ray and gamma-ray photons that arrive at the Earth just 8 minutes later (other particles from the Sun may arrive days later) and dramatically increase the ionization that happens in the atmosphere.

Roughly 6 billion years from now, the Earth will probably be vaporized when the dying Sun expands into a red giant and engulfs our planet. But the Earth is just one planet in the solar system, the Sun is just one of hundreds of billions of stars in the galaxy, and there are hundreds of billions of galaxies in the observable universe. How does the universe end? The science is much less settled on how that will happen. Our best understanding of physics suggests there are several options for the universal apocalypse. It also offers some hints on how we might, just maybe, survive it. Our first clue to the end of the universe comes from thermodynamics, the study of heat. Thermodynamics is the wild-eyed street preacher of physics, bearing a cardboard placard with a simple warning: This may not sound scary, but the heat death is far worse than being burnt to a crisp. Your computer runs on electricity from the local power plant, which probably works by heating water and using that to power a turbine. And you run on food, which exists thanks to the enormous temperature difference between the Sun and the rest of the universe. However, once the universe reaches heat death, everything everywhere will be the same temperature. That means nothing interesting will ever happen again. Heat death looked like the only possible way the universe could end. Every star will die, nearly all matter will decay, and eventually all that will be left is a sparse soup of particles and radiation. Even the energy of that soup will be sapped away over time by the expansion of the universe, leaving everything just a fraction of a degree above absolute zero. In this "Big Freeze", the universe ends up uniformly cold, dead and empty. After the development of thermodynamics in the early 19th century, heat death looked like the only possible way the universe could end. View image of Galaxies like M74 are rushing away from us Credit: This relationship between space-time and matter-energy stuff "between the stage and the actors on it" extends to the entire universe. The stuff in the universe, according to Einstein, determines the ultimate fate of the universe itself. The universe began as something incredibly small, and then expanded incredibly quickly. The theory predicted that the universe as a whole must either be expanding or contracting. It could not stay the same size. Einstein realized this in 1917, and was so reluctant to believe it that he fudged his own theory. Then in 1929, the American astronomer Edwin Hubble found hard evidence that the universe was expanding. Einstein changed his mind, calling his previous insistence on a static universe the "greatest blunder" of his career. If the universe is expanding, it must once have been much smaller than it is now. This realization led to the Big Bang theory: We can see the "afterglow" of the Big Bang even today, in the cosmic microwave background radiation "a constant stream of radio waves, coming from all directions in the sky. The fate of the universe, then, hinges on a very simple question: More stuff means more gravity, which pulls everything back together and slows the expansion. Then the universe will begin to contract. A contracting universe will shrink smaller and smaller, getting hotter and denser, eventually ending in a fabulously compact inferno, a sort of reverse Big Bang known as the Big Crunch. Would it be the Big Freeze or the Big Crunch? Dark energy pulls the universe apart. They tried to perform a cosmic census, adding up how much stuff there is in our universe. That all changed at the end of the 20th century. In 1998, two competing teams of astrophysicists made an astonishing announcement: Dark energy pulls the universe apart. View image of The Big Crunch would bring our universe to a fiery end Credit: Instead, dark energy controls the cosmos, accelerating the expansion of the universe for all time. This makes the Big Crunch much less likely. There are other possibilities. One of them originated, not in the study of the cosmos, but in the world of subatomic particles. This is perhaps the strangest fate for the universe. It sounds like something out of science fiction, and in a way, it is. View image of Water can sometimes stay liquid below its freezing point Credit: Tomas Sobek, CC by 2. When a crystal of ice-nine is dropped into a glass of water, all the water around it immediately patterns itself after the crystal, since it has lower energy than liquid water. The same thing can happen in real life with normal ice and normal water. But if you drop a crystal of ice into the glass, the water will freeze rapidly, just like ice-nine. Ice-nine and supercooled water

may not seem relevant to the fate of the universe. But something similar could happen to space itself. Quantum physics dictates that even in a totally empty vacuum, there is a small amount of energy. But there might also be some other kind of vacuum, which holds less energy. It will only last until a "bubble" of lower-energy vacuum shows up. Unfortunately, quantum physics also dictates that if a lower-energy vacuum is possible, then a bubble of that vacuum will inevitably dart into existence somewhere in the universe. When that happens, just like ice-nine, the new vacuum will "convert" the old vacuum around it. Inside the bubble, things would be radically different, and not terribly hospitable. Humans, planets and even the stars themselves would be destroyed. The properties of fundamental particles like electrons and quarks could be entirely different, radically rewriting the rules of chemistry and perhaps preventing atoms from forming. Humans, planets and even the stars themselves would be destroyed in this Big Change. In a paper, Physicists Sidney Coleman and Frank de Luccia called it "the ultimate ecological catastrophe". Adding insult to injury, dark energy would probably behave differently after the Big Change. Rather than driving the universe to expand faster, dark energy might instead pull the universe in on itself, collapsing into a Big Crunch. View image of Phantom dark energy could destroy everything Credit: Dark energy might be even more powerful than we thought, and might be enough to end the universe on its own, without any intervening Big Change, Freeze, or Crunch. Dark energy has a peculiar property. As the universe expands, its density remains constant. That means more of it pops into existence over time, to keep pace with the increasing volume of the universe. However, it could get weirder. What if the density of dark energy increases as the universe expands? In other words, what if the amount of dark energy in the universe increases more quickly than the expansion of the universe itself? He calls it "phantom dark energy". It leads to a remarkably strange fate for the universe. If phantom dark energy exists, then the dark side is our ultimate downfall, just like Star Wars warned us it would be. Atoms themselves would shatter, a fraction of a second before the universe itself ripped apart. Right now, the density of dark energy is very low, far less than the density of matter here on Earth, or even the density of the Milky Way galaxy, which is much less dense than Earth. But as time goes on, the density of phantom dark energy would build up, and tear the universe apart. In a paper, Caldwell and his colleagues outlined a scenario they called "cosmic doomsday". Once the phantom dark energy becomes more dense than a particular object, that object gets torn to shreds. First, phantom dark energy would pull the Milky Way apart, sending its constituent stars flying. Then the solar system would be unbound, because the pull of dark energy would be stronger than the pull of the Sun on the Earth. Finally, in a few frantic minutes the Earth would explode. Then atoms themselves would shatter, a fraction of a second before the universe itself ripped apart. Caldwell calls this the Big Rip. There are good reasons not to believe in it. Based on our observations of the expansion of the universe, and particle physics experiments, it seems much more likely that the ultimate fate of our universe is a Big Freeze, possibly followed by a Big Change and a final Big Crunch. But this is a remarkably grim portrait of the future – aeons of cold emptiness, finally terminated by a vacuum decay and a final implosion into nothingness. Is there any escape? Or are we doomed to book a table at the Restaurant at the End of the Universe? View image of All this shall pass, but not for a very long time Credit: If nothing else, genetic drift will have rendered our descendants unrecognizable long before then. But could intelligent feeling creatures of any kind, human or not, survive? At the time, he concluded that life could modify itself to survive the Big Freeze, which he thought was less challenging than the inferno of the Big Crunch. Some physicists have proposed a solution that is solidly in mad-scientist territory. To escape the end of the universe, we should build our own universe in a laboratory, and jump in. One physicist who has worked on this idea is Alan Guth of MIT in Cambridge, Massachusetts, who is known for his work on the very early universe. It would require huge amounts of energy that one would need to be able to obtain and control. By doing that in the right way, and then quickly clearing the matter out of the area, you might be able to force that region of space to start expanding rapidly. In effect, you would jump-start the creation of an entirely new universe. As the space in the region expanded, the boundary would shrink, creating a bubble of warped space where the inside was bigger than the outside. View image of Other universe may be appearing all the time Credit:

Chapter 8 : Scientology Beliefs about "Creation of the Universe" | STAND

You may have seen the "northern lights" in the fall of , even if you live as far south as Texas or Italy. This energy in the sky originated in record-setting solar flares and coronal mass ejections triggered by the sudden release of magnetic energy near sunspots.

As there never was a time when God did not exist, and as activity is an essential part of His being John 5: It was natural with St. John, when placing the same words at the commencement of his Gospel, to carry back our minds to a more absolute conceivable "beginning," when the work of creation had not commenced, and when in the whole universe there was only God. A word plural in form, but joined with a verb singular, except when it refers to the false gods of the heathen, in which case it takes a verb plural. Its root-meaning is strength, power; and the form Elohim is not to be regarded as a pluralis majestatis, but as embodying the effort of early human thought in feeling after the Deity, and in arriving at the conclusion that the Deity was One. Thus, in the name Elohim it included in one Person all the powers, mights, and influences by which the world was first created and is now governed and maintained. In the Vedas, in the hymns recovered for us by the decipherment of the cuneiform inscriptions, whether Accadian or Semitic, and in all other ancient religious poetry, we find these powers ascribed to different beings; in the Bible alone Elohim is one. Christians may also well see in this a foreshadowing of the plurality of persons in the Divine Trinity; but its primary lesson is that, however diverse may seem the working of the powers of nature, the Worker is one and His work one. It is quite possible, therefore, that the word bara, "he created," may originally have signified to hew stone or fell timber; but as a matter of fact it is a rare word, and employed chiefly or entirely in connection with the activity of God. As, moreover, "the heaven and the earth" can only mean the totality of all existent things, the idea of creating them out of nothing is contained in the very form of the sentence. Even in Genesis 1: The heaven and the earth. To the Hebrew this consisted of our one planet and the atmosphere surrounding it, in which he beheld the sun, moon, and stars. But it is one of the more than human qualities of the language of the Holy Scriptures that, while written by men whose knowledge was in accordance with their times, it does not contradict the increased knowledge of later times. Contemporaneous with the creation of the earth was the calling into existence, not merely perhaps of our solar system, but of that sidereal universe of which we form so small a part; but naturally in the Bible our attention is confined to that which chiefly concerns ourselves. Throughout the first account of creation Genesis 1: This word is strictly a plural of Eloah, which is used as the name of God only in poetry, or in late books like those of Nehemiah and Daniel. It is there an Aramaism, God in Syriac being Aloho, in Ohaldee Ellah, and in Arabic Allahu--all of which are merely dialectic varieties of the Hebrew Eloah, and are used constantly in the singular number. In poetry EJoah is sometimes employed with great emphasis, as, for instance, in Psalm The plural thus intensified the idea of the majesty and greatness of God; but besides this, it was the germ of the doctrine of a plurality of persons in the Divine unity. In the second narrative Genesis 2: The spelling of the word Jehovah is debatable, as only the consonants J, h, v, h are certain, the vowels being those of the word Adonai Lord substituted for it by the Jews when reading it in the synagogue, the first vowel being a mere apology for a sound, and pronounced a or e, according to the nature of the consonant to which it is attached. The former has the analogy of several other proper names in its favour; the second the authority of Exodus 3: At the end of proper names the form it takes is Yahu, whence also Yah. We ought also to notice that the first consonant is really y; but two or three centuries ago j seems to have had the sound which we give to y now, as is still the case in German. But this is not a matter of mere pronunciation; there is a difference of meaning as well. Yahveh signifies "He who brings into existence;" Yehveh "He who shall be, or shall become;" what Jehovah may signify I do not know. We must further notice that the name is undoubtedly earlier than the time of Moses. At the date of the Exodus the v of the verb had been changed into y. Thus, in Exodus 3: The next fact is that the union of these two names--Jehovah-Elohim--is very unusual. In this short narrative it occurs twenty times, in the rest of the Pentateuch only once Exodus 9: Once, moreover, in Psalm 1: There must, therefore, be some reason why in this narrative this peculiar junction of the two names is so predominant. The usual answer is that in this section

God appears in covenant with man, whereas in Genesis 1: This is true, but insufficient; nor does it explain how Jehovah became the covenant name of God, and Elohim His generic title. Whatever be the right answer, we must expect to find it in the narrative itself. The facts are so remarkable, and the connection of the name Jehovah with this section so intimate, that if Holy Scripture is to command the assent of our reason we must expect to find the explanation of such peculiarities in the section wherein they occur. What, then, do we find? Nature without man was simply good; with man, creation had reached its goal. In this, the succeeding section, man ceases to be very good. Inferior creatures work by instinct, that is, practically by compulsion, and in subjection to rules and forces which control them. Man, as a free agent, attains a higher rank. He is put under law, with the power of obeying or disobeying it. God, who is the infinitely high and self-contained, works also by law, but it comes from within, from the perfectness of His own nature, and not from without, as must be the case with an imperfect being like man, whose duty is to strive after that which is better and more perfect. But as this likeness is a gift conferred upon him, and not inherent, the law must come with the gift, from outside, and not from himself; and it can come only from God. Thus, then, man was necessarily, by the terms of his creation, made subject to law, and without it there could have been no progress upward. But he broke the law, and fell. Was he, then, to remain for ever a fallen being, hiding himself away from his Maker, and with the bonds of duty and love, which erewhile bound him to his Creator, broken irremediably? Scarcely has the breach been made I before One steps in to fill it. The breach had been caused by a subtle foe, who had beguiled our first parents in the simplicity of their innocence; but in the very hour of their condemnation they are promised an avenger, who, after a struggle, shall crush the head of their enemy Genesis 3: Now this name, Y-h-v-h, in its simplest form Yehveh, means "He shall be," or "shall become. Paul tells us of a notable change in the language of the early Christians. Their solemn formula was Maran-atha, "Our Lord is come" 1Corinthians The Deliverer was no longer future, no longer "He who shall become," nor "He who shall be what He shall be. The faint ray of light which dawned in Genesis 3: Distinctly from the words of Eve, so miserably disappointed in their primary application: The hope was at first dim, distant, indistinct, but it was the foundation of all that was to follow. Prophets and psalmists were to tend and foster that hope, and make it clear and definite. But the germ of all their teaching was contained in that mystic four-lettered word, the tetragrammaton, Y-h-v-h. The name may have been popularly called Yahveh, though of this we have no proof; the Jews certainly understood by it Yehveh--"the coming One. The force of this letter prefixed to the root form of a Hebrew verb is to give it a future or indefinite sense; and I can find nothing whatsoever to justify the Assertion that Jehovah--to adopt the ordinary spelling--means "the existent One," and still less to attach to it a causal force, and explain it as signifying "He who calls into being. But in this section, in which the name occurs twenty times in the course of forty-six verses, there is a far deeper truth than Eve supposed. Jehovah Yehveh is simply "the coming One," and Eve probably attached no very definite idea to the words she was led to use. But here He is called Jehovah-Elohim, and the double name teaches us that the coming One, the future deliverer, is God, the very Elohim who at first created man. The unity, therefore, and connection between these two narratives is of the closest kind: Pulpit Commentary Verse 1. The formula, "And God said," with which each day opens, rather points to ver. Its plural form is to be explained neither as a remnant of polytheism Gesenius , nor as indicating a plurality of beings through whom the Deity reveals himself Baumgarten, Lange , nor as a plural of majesty Aben Ezra, Kalisch, Alford , like the royal "we" of earthly potentates, a usage which the best Hebraists affirm to have no existence in the Scriptures Macdonald , nor as a cumulative plural, answering the same purpose as a repetition of the Divine name Hengstenberg, Dreschler, and others ; but either 1 as a pluralis intensitatis, expressive of the fullness of the Divine nature, and the multiplicity of the Divine powers Delitzsch, Murphy, Macdonald ; or, 2 notwithstanding Calvin's dread of Sabellianism, as a pluralis trinitatis, intended to foreshadow the threefold personality of the Godhead Luther, Cocceius, Peter Lombard, Murphy, Candlish, etc. The suggestion of Tayler Lewis, that the term may be a contraction for El-Elohim, the God of all superhuman powers, is inconsistent with neither of the above interpretations That the Divine name should adjust itself without difficulty to all subsequent discoveries of the fullness of the Divine personality and nature is only what we should expect in a God-given revelation. Unless where it refers to the angels Psalm 8: Bara, one of three terms employed in this section, and in Scripture

generally, to describe the Divine activity; the other two being *yatzar*, "formed," and *asah*, "made" - both signifying to construct out of pre-existing materials *cf.* *Barn* is used exclusively of God. Though not necessarily involved in its significance, the idea of creation *ex nihilo* is acknowledged by the best expositors to be here intended. Its employment in *vers.* In the sense of producing what is new it frequently occurs in Scripture *cf.* Thus, according to the teaching of this venerable document, the visible universe neither existed from eternity, nor was fashioned out of pre-existing materials, nor proceeded forth as an emanation from the Absolute, but was summoned into being by an express creative *fiat*. The New Testament boldly claims this as a doctrine peculiar to revelation Hebrews Modern science explicitly disavows it as a discovery of reason. The heavens and the earth *i.* The earth and the heavens always mean the terrestrial globe with its aerial firmament. The earth here alluded to is manifestly not the dry land *ver.* The heavens are the rest of the universe. The Hebrews were aware of other heavens than the "firmament" or gaseous expanse which over-arches the earth. The fundamental idea associated with the term was that of height *shamayim*, literally, "the heights" - Gesenius, Furst. The Saxon thought of "the heaved-up arch. Though not anticipating modern astronomical discovery, he had yet enlarged conceptions of the dimensions of the stellar world Genesis The connection of the present verse with those which follow has been much debated. The proposal of Aben Ezra, adopted by Calvin, to read, "In the beginning when God created the heavens and the earth, the earth was" is grammatically inadmissible. Equally objectionable on the ground of grammar is the suggestion of Bunsen and Ewald, to connect the first verse with the third, and make the second parenthetical; while it is opposed to that simplicity of construction which pervades the chapter. The device of Drs. Buckland and Chalmers, so favorably regarded by some harmonists of Scripture and geology, to read the first verse as a heading to the whole section, is exploded by the fact that no historical narration can begin with "and. It is no exception, the second book of Moses being in reality a continuation of the first. Honest exegesis requires that *ver.* I shall be viewed as descriptive of the first of the series of Divine acts detailed in the chapter, and that *ver.* Matthew Henry Commentary 1: The faith of humble Christians understands this better than the fancy of the most learned men. From what we see of heaven and earth, we learn the power of the great Creator. And let our make and place as men, remind us of our duty as Christians, always to keep heaven in our eye, and the earth under our feet.

Chapter 9 : The Maze Runner (series) - Wikipedia

The Champions are a prominent superhero team in the Hero Universe, the official setting of the Champions role-playing game. They serve as an example of a balanced team dynamic, a team of NPC allies, or a source of pregenerated characters to allow players to bypass the game's lengthy character creation process.

Share Solar Flares You may have seen the "northern lights" in the fall of , even if you live as far south as Texas or Italy. This energy in the sky originated in record-setting solar flares and coronal mass ejections triggered by the sudden release of magnetic energy near sunspots. The images show the flares and sunspots on October 28, The emitted energy is spread across the electromagnetic spectrum, from radio waves through gamma rays. Movie of the coronal mass ejection CME on October 28, A disk blocks the light of the sun itself to make the CME visible. Compare the positions of flares and sunspots. In coronal mass ejections CMEs , mentioned above, the sun belches forth vast amounts of matter—up to 10 billion tons of plasma see Plasma Power. CMEs are often associated with solar flares, and the one that followed the November 4 flare is shown in the movie. Even in its quiet state, the sun emits a constant stream of plasma called the solar wind, which fills space in the solar system. The solar wind and the CME—two plasmas—interact. The leading edge of the CME produces damaging high energy particles as it moves through the solar wind, even far from the sun. The Mars Odyssey spacecraft, more than halfway to its destination, was briefly disabled by these charged particles from the October 28 flare, and a radiation-monitoring instrument on the satellite has not recovered yet. Moreover, had astronauts been on the surface of Mars at this time, they would have been in great danger from the heavy dose of particle radiation. In addition, the high energy charged particles produced by the CME can be dangerous to spacecraft and astronauts. Note that the particle spirals in, reaches a minimum altitude, and is then reflected in the opposite direction. Cassini was designed to make a variety of measurements in the near-Saturn environment, including radio emissions, so it was well equipped to observe radio bursts that were produced by these two solar flares. The Van Allen radiation belts, with Earth in the center. An electron in the inner belt can make this round trip in about one second. The source of this material is Windows to the Universe, at <http://> These radio bursts were not part of the flare itself, but rather were generated when a beam of electrons ejected by the flare interacted with the solar wind. Once excited, these electrons emit radio waves at that same frequency, and these were the signals that Cassini observed. Part of the Cassini data for the October 28 flare is shown in the graph, which plots frequency vs. The labels show that the data covered roughly the frequency range of AM radio. The leading edge of the burst arrived 69 minutes after the solar flare, since that was the radio travel-time from the sun to the spacecraft, then located about 8. In the graph, notice how the frequency of the radio waves diminished with time after the burst arrived. As the electron beam propagated farther from the sun, it excited radio waves with a lower frequency, corresponding to the decrease of frequency with time that Cassini observed. The data from this radio burst have been turned into sound by electronic manipulation. To hear this sound, click and then click on each of the colored graphs you will see. Notice how the drop in pitch of the sound corresponds to the rapid decrease of the frequency shown in the graph. The principal investigator of the radio wave instrument on the Cassini Project is Don Gurnett, James Van Allen Professor of Physics at the University of Iowa, which has long been a center of space research. At Iowa, in , Van Allen built the detector that found the first evidence for the regions of energetic electrons around Earth, known as the Van Allen radiation belts see drawing below. In his own career at Iowa, Gurnett has contributed to many probes, including serving as principal investigator for the plasma wave investigation on Galileo, whose mission included observations of the magnetic field of Jupiter and the plasma that surrounds it, and principal investigator for the plasma wave instrument on the two Voyager spacecraft, which flew by Jupiter, Saturn, Uranus, and Neptune, and are now proceeding outward into interstellar space. A plot of radio wave frequency vs. The y-axis shows the frequency of the radio waves, which is approximately in the AM band. The x-axis shows time.